On the Soil Microfauna of the Hawaiian Islands

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PALPIGRADA

The presence of Palpigrada in the Hawaiian Archipelago was first discovered by R. H. Van Zwaluwenburg in 1924 who found some of these Arachnida in soil of sugar cane fields on Oahu, at depths of 7 to 11 inches (Muir, PROC. HAW. ENT. SOC. 6(1):26, 1925). Other representative specimens of this group were discovered somewhat later in Honolulu, Waianae and Kahuku (*Ibid.* 6(2):225, 1926).

Van Zwaluwenburg (in Williams, 1931; HANDBOOK OF INSECTS AND OTHER INVERTEBRATES OF HAWAIIAN SUGAR CANE FIELDS, Experiment Station, HSPA, Honolulu, pp. 343–344) observed that Palpigrada are rather numerous in the soil of the archipelago. He stated that they "averaged 24 to the surface square foot (even more found in the fallow soil series), nearly half of them occurring below 7 inches." In this same work, this author relates that C. R. Crosby discovered a specimen of Palpigrada ("Microthelyphonida" writes Van Zwaluwenburg) among specimens from Hawaiian sugar cane fields, no mention being made of the exact locality. I have not seen any of the specimens upon which these records were based.

K. Sakimura of the Pineapple Research Institute of Hawaii found a Palpigrada at Paalaa-Uka, Oahu, in soil of a pineapple field "1000 ft. elevation, 60 in. annual rainfall, near undisturbed native forest zone" on the 25th of June, 1957. He sent me this animal for determination. As I lately published (BULL. MAURITIUS INST. 5(3):94–102, 1958)[1], the specimen was a female of *Eukoenenia hanseni* Silvestri, 0.30 mm. long. According to Condé (BULL. MUS. NATION. HIST. NAT. (2)23:211–216, 1951), this species is very likely identical to *E. florenciae* Rucker from Texas.

Sakimura has just sent me two other Hawaiian examples of this Palpigrada which he captured "in pineapple field, Helemano, Island of Oahu, March 18, 1959, 1200 ft. elevation, 60 in. annual rainfall, near forest area (Acces. No. S-124)." These are adult females, 1.30 and 1.40 mm. long respectively which, like the earlier specimen, are quite similar to examples from Mexico, North Africa (Morocco, Nether-Egypt), Madagascar, Bourbon and Maurice Islands.

[1] In this work, Oahu was wrongly spelled Oaku.

PAUROPODA

As far as I know, the presence of Pauropoda on the Hawaiian Islands has been reported only by Van Zwaluwenburg in Williams (op. cit., p. 346). He states that *Pauropus*, probably *huxleyi* Lubbock, are fairly common there in sugar cane fields "averaging 130 per surface square foot in the growing cane samples (as against 14 in the fallow series) and most numerous between 1 and 5 inches below the surface." The determination of these animals is most doubtful.

Sakimura has just sent me a pauropod which he found "in pineapple field, Pine-Spur, Island of Oahu, Jan. 23, 1958, 1000 ft. elevation, 65 in. annual rainfall, near forest area (Acces. No. S-107)." This animal is in a bad condition and could not be studied thoroughly and properly. It is an *Allopauropus* (*A.*) female, with 9 pairs of legs, belonging to the group of *A. danicus* Hansen. I have made on it the following observations:

Antennae.—Bristles of segment IV: $p = 83$, $r = 38$. The tergal branch is about 3.5 times as long as wide, is equal to 2/7 its flagellum, and is 1.5 times as long as the sternal branch. The latter is about 1.5 times longer than wide, a little shorter (4/5) than its sternal hair, and is equal to 3/5 its anterior flagellum F_2: which itself is shorter than half (14/33) of the posterior flagellum F_3. The width of its globule g is approximately equal to the total length of the organ, and much smaller than the width of the tergal branch.

Trunk.—The two posterior bristles of the tergite VI are acute, their length nearly equal to the distance between them, and also to the pygidial setae a_1. The tactile setae I to V are acute. Their pubescence is rather long, stiff, simple, and slanting everywhere except on the distal region of I and II, where it becomes perpendicular to the axis. The coxal hair and trochanteral hair of legs I to IX are branched, one of the branches being very short on legs I to VIII, both being well developed on leg IX. On the tarsi of this last pair, the proximal hair is equal to 3/7 the length of the segment, and nearly 4 times that of the distal hair.

Pygidium.—Tergum: $a_1 = 118$, $a_2 = 134$, $a_3 = 230$, $a_1a_1 = 64$, $a_1a_2 = 45$, a_2a_3 very small. The styli are thick and ovoid; the distance between them is shorter (9/16) than that between the a_1 pair. Sternum: $b_1 = 105$, $b_1b_1 = 85$, $b_2 = 66$, $b_1b_2 = 52$, $b_3 = 35$ (sub-cylindrical), $b_3b_3 = 104$. The anal plate could not be seen properly.

Pauropoda must not be rare on the Hawaiian Islands. It is to be wished that they might draw more attention from the zoologists of the archipelago.